

CLAIMS

1 1. A cleaning polish etch composition for treating a superfinished surface of a substrate, the
2 cleaning polish etch composition consisting essentially of:

3 a carrying fluid;

4 etchant for etching the substrate and/or attached slurry particles.

1 2. The cleaning polish etch composition as recited in claim 1, wherein the substrate is
2 selected from a group consisting of a glass disk substrate, a ceramic disk substrate, and a glass-
3 ceramic disk substrate for use in a data storage device.

1 3. The cleaning polish etch composition as recited in claim 2, wherein the substrate is a
2 silicate-based glass disk substrate.

3 4. The cleaning polish etch composition as recited in claim 3, wherein the cleaning polish
4 etch composition has a pH of approximately 0 to 4.

5 5. The cleaning polish etch composition as recited in claim 4, wherein the cleaning polish
6 etch composition has a pH of approximately 0.8 to 3.0.

7 6. The cleaning polish etch composition as recited in claim 5, wherein the cleaning polish
8 etch composition has a pH of approximately 1.0 to 2.0.

1 7. The cleaning polish etch composition as recited in claim 1, wherein the substrate is a
2 head wafer selected from a group consisting of Sendust and Permalloy.

1 8. The cleaning polish etch composition as recited in claim 7, wherein the substrate is a
2 Sendust head wafer.

1 9. The cleaning polish etch composition as recited in claim 8, wherein the cleaning polish
2 etch composition has a pH of approximately 6 to 10.

1 10. The cleaning polish etch composition as recited in claim 9, wherein the cleaning polish
2 etch composition has a pH of approximately 9.5 to 10.

1 11. The cleaning polish etch composition as recited in claim 1, wherein the etchant is an
2 acid or base solution.

1 12. The cleaning polish etch composition as recited in claim 3, wherein the etchant is a
2 metal etchant selected from a group of consisting of Ce, Zr, Ti, Fe, Sn, Al, Cr, Ni, Mn and Zn,
3 and combinations thereof.

4 13. The cleaning polish etch composition as recited in claim 12, wherein the metal etchant
5 is Ce.

6 14. The cleaning polish etch composition as recited in claim 8, wherein the etchant is a
7 metal etchant selected from a group consisting of Ce, Zr, Ti, Fe, Sn, Al, Cr, Ni, Mn and Zn, and
8 combinations thereof.

9 15. The cleaning polish etch composition as recited in claim 14, wherein the metal etchant
2 is Fe.

1 16. A process for superfinishing a surface of a substrate, the process comprising the steps
2 of:

3 (a) superfinishing the surface of the substrate by performing the substeps of
4 applying a colloidal slurry to the surface of the substrate;
5 mechanically rubbing the surface of the substrate with a pad while contacting the
6 surface of the substrate with the colloidal slurry;

7 (b) removing slurry particles from the surface of the substrate after step (a) by performing
8 the substeps of

9 applying a cleaning polish etch composition to the surface of the substrate, the
10 cleaning polish etch composition comprising
11 a carrying fluid,
12 etchant for etching the substrate and/or attached slurry particles;
13 mechanically rubbing the surface of the substrate with a pad while contacting the
14 surface of the substrate with the cleaning polish etch composition.

15 17. The process as recited in claim 16, wherein the substrate is selected from a group
16 consisting of a glass disk substrate, a ceramic disk substrate, and a glass-ceramic disk substrate
17 for use in a data storage device.

18 18. The process as recited in claim 17, wherein the substrate is a silicate-based glass disk
19 substrate.

20 19. The process as recited in claim 18, wherein the cleaning polish etch composition has a
21 pH of approximately 0 to 4.

22 20. The process as recited in claim 19, wherein the cleaning polish etch composition has a
23 pH of approximately 0.8 to 3.0.

1 21. The process as recited in claim 20, wherein the cleaning polish etch composition has a
2 pH of approximately 1.0 to 2.0.

1 22. The process as recited in claim 16, wherein the substrate is a head wafer selected from
2 a group consisting of Sendust and Permalloy.

1 23. The process as recited in claim 22, wherein the substrate is a Sendust head wafer.

1 24. The process as recited in claim 23, wherein the cleaning polish etch composition has a
2 pH of approximately 6 to 10.

1 25. The process as recited in claim 24, wherein the cleaning polish etch composition has a
2 pH of approximately 9.5 to 10.

1 26. The process as recited in claim 16, wherein the etchant is an acid or base solution.

1 27. The process as recited in claim 18, wherein the etchant is a metal etchant selected from
2 a group consisting of Ce, Zr, Ti, Fe, Sn, Al, Cr, Ni, Mn and Zn, and combinations thereof.

1 28. The process as recited in claim 27, wherein the metal etchant is Ce.

1 29. The process as recited in claim 23, wherein the etchant is a metal etchant selected from
2 a group consisting of Ce, Zr, Ti, Fe, Sn, Al, Cr, Ni, Mn and Zn, and combinations thereof.

1 30. The process as recited in claim 29, wherein the metal etchant is Fe.

1 31. The process as recited in claim 16, further comprising the steps of rinsing and cleaning
2 the surface of the substrate, wherein the rinsing step is performed using a deionized water rinse
3 after the step (b), and wherein the cleaning step is performed using standard soap solutions after
4 the rinsing step and removes substantially all of the slurry particles remaining on the surface of
5 the substrate after the rinsing step.

1 32. A cleaning polish etch process for treating a superfinished surface of a substrate, the
2 cleaning polish etch process comprising the steps of:
3 applying a cleaning polish etch composition to the surface of the substrate, the cleaning
4 polish etch composition consisting essentially of
5 a carrying fluid,
6 etchant for etching the substrate and/or attached slurry particles;
7 mechanically rubbing the surface of the substrate with a pad while contacting the surface
8 of the substrate with the cleaning polish etch composition.